

## Occupational Health and Safety Advisory Services (OHSAS) 18001 Management System Adoption: Assessing the Determinants

*(Adaptasi Sistem Pengurusan Khidmat Nasihat Kesihatan dan Keselamatan Pekerja (OHSAS) 18001: Penilaian Penentu)*

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### ABSTRACT

*This study employed structural equation modeling (SEM) and partial least square (PLS) tools to examine the determinants (namely management commitment, work involvement, incentive and recognition, and supportive environment) involved in the adoption of OHSAS 18001 management system by industries in Malaysia. Survey data was drawn from a sample of 128 OHSAS 18001 certified companies from various industries. Statistical results confirmed that only management commitment and supportive environment positively influence OHSAS 18001 management system adoption, while work involvement, and incentive and recognition are not significantly influencing OHSAS 18001 adoption. The findings are useful for practitioners that are considering the adoption of OHSAS 18001 management system in their companies. This paper concludes with discussion, implications, limitations and suggestion for future study.*

*Keywords: Ta'widh (compensation); gharamah (penalty charges); defaulting customers; actual loss; Muslim scholars' view; Islamic banking*

### ABSTRAK

*Kajian ini menggunakan kaedah struktural equation modeling (SEM) dan partial least square (PLS) untuk menguji penentu (iaitu komitmen pengurusan, penglibatan kerja, insentif dan pengiktirafan, serta persekitaran sokongan) daripada adaptasi sistem pengurusan OHSAS 18001 dalam industri di Malaysia. Data kajian telah diambil daripada 128 sampel syarikat yang memperoleh persijilan OHSAS 18001 dari pelbagai industri di Malaysia. Hasil statistik mengesahkan bahawa komitmen pengurusan dan persekitaran sokongan sahaja yang mempengaruhi adaptasi sistem pengurusan OHSAS 18001 secara positif, manakala penglibatan kerja, dan insentif serta pengiktirafan tidak mempengaruhi adaptasi OHSAS 18001 secara signifikan. Penemuan ini berguna untuk pengamal bagi mempertimbangkan adaptasi sistem pengurusan OHSAS 18001 dalam syarikat mereka. Kajian ini diakhiri dengan perbincangan, implikasi, limitasi dan cadangan untuk kajian masa depan.*

*Kata kunci: Kesihatan dan keselamatan pekerja; bahaya; kemalangan; risiko; industri; Malaysia*

### INTRODUCTION

In recent years, there are many ongoing work related accidents, incidents and near miss cases reported by industries. The number of fatalities encountered by the industrial sector is alarming. Out of a total of 61,552 accidents reported to Social Security Organization (SOCO) in 2012, 5,177 reports were from the construction industry (SOCO 2012). The high number of incidents of injury and fatality in industry is generally due to the work nature, which involves various work hazards, such as climbing tall building, moving of machinery, electrical work and exposure to excessive noise. The underlying causes are generally attributed to the lack of trained workers and experienced site supervisors on occupational safety and health matters, lack of communication on health and safety information, insufficient training on new technology, lack of communication between top management and workers, lack of understanding in safety protection and tools, and

weak information channel from top management, and also the misunderstanding that occupational safety and health protection is an unnecessary expenditure (Mazlan 2010).

In fact, the concept of occupational health and safety management system was introduced to industries in Malaysia in 1994 (Zakaria, Hussin, Noordin & Zakaria 2010). However, the law and regulations on health and safety in Malaysia are still considered general. The adoption of occupational health and safety management system in Malaysia is not mandatory. Therefore, the implementation of such management system is at the mercy of the companies' management.

OHSAS 18001 management system is well recognized as management arrangements that cover the planning and review stages until the implementation of a specific program to improve the organizational health and safety performance (Bakri, Mohd Zin, Misnan & Hakim 2006). Most previous studies had focused on the implementation

of OHSAS 18001 management system in the construction industry and neglected other industries, such as the chemical industry, manufacturing and transportation industry, which are also considered as high risk industries. Although the relationship between the health and safety program and the actual safety culture had been widely studied, minimal effort has been directed in studying the factors contributing to the success of OHSAS 18001 management system's adoption (Bakri et al. 2006). Hence, this study intends to reveal the key determinants that drive companies to adopt OHSAS 18001 management system in order to improve company performance.

## LITERATURE REVIEW

### OHSAS 18001 MANAGEMENT SYSTEM ADOPTION

Before 1994, law and regulations related to safety and health of worker were referred to as Factories and Machinery Act (FMA) 1967. Nonetheless, since the introduction of the health and safety occupational act (OSHA) in 1994 to overcome the limitations of FMA 1967, the number of accidents in Malaysia's industries has shown a significant reduction (Zakaria et al. 2010). Nowadays, the government is active in monitoring OSHA performance in the industries as to ensure compliance of the requirement and hence reduce the number of accidents. Requirements for effective occupational health and safety imposed by government include (Mazlan 2010):

1. Setting up safety and health policy in the work place
2. Establishing safety and health regulation at the construction site
3. Creating a job position responsible for employee's safety and health.
4. Committing the organization to full compliance with all relevant health and safety legislation
5. Rolling out safety and health training program and campaign
6. Forming hazard prevention and control
7. Forming worksite analysis
8. Subcontractors safety program inspection and follow up on the safety program
9. Recording and analysing all accidental injuries and fatalities
10. Establishing first aid program planning for emergencies
11. Documentation

The OHSAS 18001:2007 standard is the most widely recognized occupational health and safety management system. This standard was first introduced in year 1999. It puts together requirements from various sources into a specification and bringing about clarity on OHSAS requirements. It defines the fundamental structure and authority for the encouragement, regulation and enforcement of workplace health, safety and welfare. This

structured management system enables organizations to identify hazards, assess and prioritize risks, and implement appropriate protective and preventive control measures to reduce the potential occupational injuries, illnesses and fatalities. Today, the role of employee wellness program is gradually getting attention because it is believed to improve business performance, reduce absenteeism due to sickness, increase productivity, retain staff, create a safe and healthy workforce and increase employee engagement and morale (Baicker, Cutler & Song 2010). A study conducted by Omran, Abu Bakar and Teh (2008) revealed that majority of the 58 participating companies (85.3%) responded that the adoption of OHSAS 18001 management system has contributed to their companies' successes with respect to reduction in accidental cost (80.9%), enhance the image of the company (67.7%), increase business opportunity (50.0%), and increase business opportunity (27.9%).

Based on Bakri et al. (2006)'s study, OHSAS 18001 management system is a neglected area and has not been systematically pursued, particularly in the construction industry. Usually, many occupational accidents and injuries are primarily due to break down in the existing OHSAS 18001 management system (Lin & Mills 2001). This finding has been further confirmed by the results obtained by Bakri et al. (2006) whereby many occupational accidents and injuries are due to the absence of, or inadequacies in the existing OHSAS 18001 management system. Au Young's (2011) study reported that there were 230 fatality cases in 2008 in Malaysia. The numbers of fatalities by the top three sectors were 76 in manufacturing, 72 in construction, and 42 in agriculture, forestry, logging and fishery. On the other hand, Lind and Nenonen (2008) who conducted a study in companies which provide maintenance services in Finland revealed that the most common type of fatal accidents during maintenance services are related to falls. According to Lind and Nenonen's (2008) finding, more than thirty percents of accidents were fall related. This finding shows that the adoption of OHSAS 18001 management system is urgently required in these industries.

However, the adoption of OHSAS 18001 management system is not mandatory in Malaysia. Most of the organizations that adopted OHSAS 18001 management system are involved in high risk industries, such as construction and chemical plants. Thus, the legislative enforcement is still lacking in Malaysia (Omran et al. 2008).

### INSTITUTIONALIZATION OF OCCUPATIONAL HEALTH SYSTEM

Institutionalization involves "the processes by which social processes, obligations or actualities come to take on a rule-like status in social thought and action" (Meyer & Rowan 1977). It means a process which translates an organization's code of conduct, mission, policies, vision, and strategic plans into action guidelines applicable to

the daily activities of its officers and other employees. It aims at integrating fundamental values and objectives in organizational structures. Tolbert and Zucker (1996) suggested three basic stages of institutionalization of a management practice: pre-institutionalization, semi institutionalization, and full institutionalization. Most prior researches had focused on the third or final stage.

As in the emerging phase of an international management standard OHSAS 18001, the lack of social consensus on these practices is apparent at the national level, or there may be differences in the interpretation of the standard across countries. Therefore, it is important to understand what constitutes the basis of the adoption of the OHSAS 18001 management system in organizational structure. The value of OHSAS 18001 management system may be contested by some constituents of the institutional occupational safety and health while others promote it. Nonetheless, the OHSAS 18001 management system should be practiced by all industries in Malaysia. This could ensure an egalitarianism OHSAS 18001 management system implemented and thus shape and guide Malaysian industries.

#### DETERMINANTS OF OHSAS 18001 MANAGEMENT SYSTEM ADOPTION

From the previous studies, various determinants of OHSAS 18001 management system adoption had been examined by the researchers. Based on the literature review, there are ten determinants that are commonly studied by previous researches (refer to Table 1). Among these determinants, we have selected four determinants which are widely agreed by researchers and received the consensus in their studies. These four determinants are management commitment (Cadieux, Roy & Desmarais 2006; Chen, Wu, Chuang & Ma 2009; Zhang & Zou 2007; Zutsh & Sohal 2004), work involvement (Aksorn & Hadikusumo 2008; Cadieux et al. 2006; Zhang & Zou 2007; Zutsh & Sohal 2004), incentive and recognition (Chen et al. 2009; Aksorn & Hadikusumo 2008; Zhang & Zou 2007), and supportive environment (Cadieux et al. 2006; Zutsh & Sohal 2004). We selected supportive environment over the other determinants which two past researches had studied. This is because we believe that the supportive environment within the organization places a great influence in OHSAS 18001 management system adoption.

TABLE 1. Determinants of OHSAS 18001 management system adoption in previous studies

Determinants of OHSAS 18001 Management System Adoption	Chen, Wu, Chuang, and Ma (2009)	Cadieux, Roy, and Desmarais (2006)	Zutsh and Sohal. (2004)	Aksorn and Hadikusumo (2008)	Zhang and Zou (2007)	Total
Corporate image	√					1
Management commitment	√	√	√		√	4
Meet international trend	√			√		2
Enforcement of rules and regulation	√		√			2
Pressure from production	√		√			2
Incentive and recognition	√			√	√	3
Work involvement		√	√	√	√	4
Supportive environment		√	√			2
Safety and health training				√	√	2
Worksite analysis				√	√	2

**Management Commitment** Commitment from top management is one of the important factors in ensuring the success of a system in an organization (Cascio 1995). Commitment from top management can be as simple as being sincerely involved in the reviewing of safety work practices and attending safety committee meeting. However, according to Hansen (1989),

management commitment should constitute more proactive involvements, clear understanding of what is right and the willingness to correct what had gone wrong. To ensure a successful OHSAS 18001 management system adoption, top management must be committed in terms of providing financial support and allocating sufficient resources during the development and implementation

stages (Idoro 2008). Commitment from top management will definitely result in motivation and encourage the workers toward achieving and upholding the safety requirements. Decisions made by top management should be effectively transferred down to every worker in the organization via the company's communication channels and forums. Directives and messages should be clear and concise. In addition, the management should also "walk the talk". Scheduled or random audits, walking-around-workplace and involvement in safety campaign are essential in ensuring an effective implementation that will bring the company closer towards a hazard-free working environment. Based on the above discussion, we hypothesize that:

H<sub>1</sub> Top management commitment has a direct positive effect on the OHSAS 18001 management system adoption.

*Work Involvement* Work involvement in the OHSAS 18001 management system refers to a system designed to integrate employees' input into the program's element. Work involvement provides the channel for employees to profess their own commitment to safety and health protection. Therefore, employees who appreciate management's concern on health and safety will understand in the need for safety rules and put in effort to comply them. According to National Occupational Safety and Health (NIOSH), work involvement plays an important element in the success of OHSAS management system adoption. Promoting work involvement is not only able to improve workplace condition but also rises up employee's motivation level and hence job satisfaction. At the same time the employee's problem solving capabilities will grow with the greater responsibility in organization (Lawler 1991; Imada 1991). In order to adopt a successful OHSAS management system, both manager and employees will have to be actively involved and committed (Hadikusumo 2006). The employees can be actively involved by taking part as safety representatives, full-time safety personnel, and safety committees. Fernandez and Colburn (2000) indicated that companies that do not allow their employees to participate in the adoption of the OHSAS 18001 management system are likely to fail. Therefore, it is hypothesized that:

H<sub>2</sub> Work involvement has a direct positive effect on the OHSAS 18001 management system adoption.

*Incentive and Recognition* A good management system is a cohesive system centered on policies, strategies and procedures, which provide internal consistency and harmonization (Cooper 1997). In order to ensure the success of OHSAS 18001 management system adoption, certain incentives and recognition are used to reward the employees in an organization. This will ensure a continuous participation from the employees. Indirectly,

this approach also motivates employees and subsequently the performance of the entire organization (Aksorn & Hadikusumo 2008). The reward system could involve incentive plan, monetary-based and recognition-based reward. Incentives and monetary rewards are best in motivating employees to exert greater effort, while recognition and support to achieve occupational health and safety excellence throughout the organization; thus, motivating employees to share information and be part of a team. Recognition can be communicated through various venues, such as presentation during meeting, company intranet, and company newsletter (Milliman & Clair 1996). Besides, company can also consider in linking promotion and career development with the work involvement of the employee in OHSAS 18001 compliances. It is important to encourage employees to develop strong OHSAS 18001 awareness and to support company's commitment to occupational safety and health responsibilities (Delmas 2001). Based on the above discussion, we hypothesize that:

H<sub>3</sub> Incentive and recognition have direct positive effect on the OHSAS 18001 management system adoption.

*Supportive Environment* Creating a supportive and harmonious environment is important in ensuring the success of OHSAS 18001 management system adoption. Peer pressure serves as a positive reinforcement during the adoption of OHSAS 18001 management system. If a workgroup adopts the 'norm' that 'thinking and behaving safely' is best for all, the group as a whole will apply 'sanctions' to the individual who deviates from this norm and behaves unsafely. If the workers wish to remain as a member of the workgroup, they will practice the safety norm and behave safely. It is acceptable for workgroups to adopt their own definition of those behaviors, work practices, or tasks that are considered to be risky. This fact demonstrates the main focus of behavioral safety that the workgroups must define, and support their own safety related 'norms' (Chen et al. 2009). The organizational culture with respect to the safety and health work place is stronger in organizations; the more the concerns the employees have about safety and health issues, the better the OHSAS 18001 management system adoption (Fernandez, Junquera & Ordiz 2003). Hence, it is hypothesized that:

H<sub>4</sub> Supportive environment has a direct positive effect on the OHSAS 18001 management system adoption.

The literature review also provides support to the development of the research framework (see Figure 1) in examining the relationships between management commitment, work involvement, incentive and recognition, supportive environment, and OHSAS 18001 management system adoption.

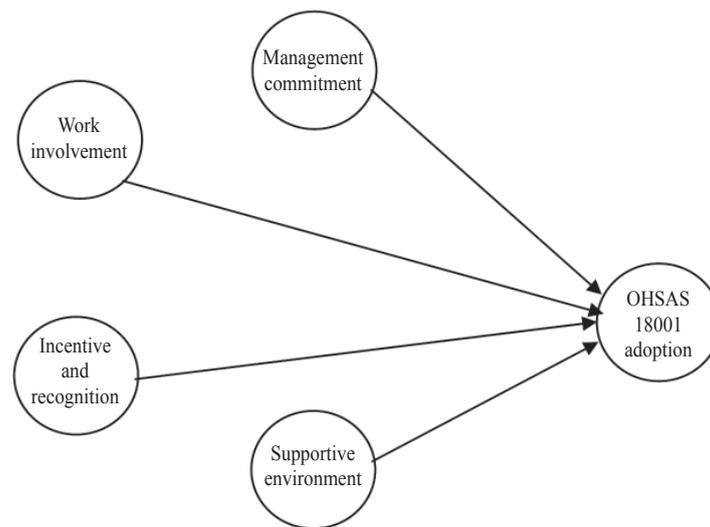


FIGURE 1. Research model

## RESEARCH METHOD

The unit of analysis in this study is the OHSAS 18001 certified companies in Malaysia. Based on the rules of thumb suggested by Hair & Black et al. (2010), the minimum respondents or sample size is ten-to-one ratio of independent variables. Since we were able to obtain the list of OHSAS 18001 certified companies from SIRIM-QAS directory, we decided to employ the census sampling approach. The questionnaire was sent to all OHSAS 18001 certified companies in Malaysia, i.e. a total of 411 companies as of the date of this study being conducted. The respondent responding on behalf of the participating companies should be the safety and health officer or safety manager who has direct involvement in OHSAS 18001 management system.

### DATA COLLECTION PROCEDURE

A total of 411 self-administered questionnaires were used for data gathering from the respondents. The duration taken to distribute and collect questionnaire was nearly 2 months. A total of 128 questionnaires, with 31.1 per cent response rate, were received and used for analysis.

### MEASURES

Respondents responded to our questionnaire by using a 5-point Likert scale. The independent variables relating to four determinants (management commitment, work involvement, incentive and recognition, and supportive environment) comprising of 25 items, were adapted from various sources (Samuel 2007; Kristian 2009). Meanwhile, OHSAS management system adoption was measured by using 10 items procured from Lefebvre and Lefebvre (2003). The measurement items for all variables of this study are listed in Table 2.

## STATISTICAL ANALYSIS

The hypotheses were tested by utilizing the Smart Partial Least Squares (PLS) software developed by Ringle, Wende and Will (2005). As the main concern of this study is to predict the relationships between the latent constructs, and to maximize the explained variance in endogenous variables, the use of Smart PLS is justified (Vinzi & Trinchera et al. 2010). We report the results in two steps. The first step is to present the measurement model results through the utilization of PLS algorithm approach. The measurement model examines the reliability and validity of the measures used to represent each construct. It provides an evaluation on how reliable the measures are and also on their convergent and discriminant validities (Chin 2010). After establishing the appropriate measures, the next step is to provide evidence to support the structural model by using the bootstrapping approach. The structural model is assessed based on the significance of the path coefficients and  $R^2$  measures.

## RESULTS

### SAMPLE PROFILE

Of the companies that completed the survey, majority of the OHSAS 18001 management system adopters are from the manufacturing industry (42.12%), construction industry (16.48%) and servicing industry (15.38%). The remaining adopters (26.02%) are from other industries, such as communication / utilities industry (8.06%), other industries (6.59%), transportation industry (4.40%), retail/wholesale industry (3.30%), government sector (1.83%), finance or insurance or real estate industry (1.47%) and health care industry (0.37%). In terms of ownership of the company, 82.03% respondents are of multi-national

TABLE 2. Measurement items

Variables	Measurement Items
Management Commitment	<p>My organization's management clearly considers safety and health to be equally important as production</p> <p>My organization's management expresses concern if safety and health program is not adhere to</p> <p>My organization's management acts decisively when a safety and health concern is raised</p> <p>My organization's management acts quickly to correct the safety and health problems</p> <p>My organization's management acts only after accident has occurred</p> <p>My organization's management praises site employee for working safely</p> <p>My organization's management disciplines site employee for not working safely</p>
Work Involvement	<p>My organization's employee aims to achieve high level of safety performance</p> <p>My organization's employee plays an active role in identifying site hazards</p> <p>My organization's employee reports accident, incident and potential hazardous situation</p> <p>My organization's employee has the responsibility to reflect on safety practices</p> <p>My organization's employee avoids being involved in accident investigation</p> <p>My organization's employee contributes to job safety if asked</p>
Incentive and Recognition	<p>My organization's employees receive positive feedback from their supervisor / manager by performing responsibly in safety and health practices.</p> <p>All members of my organization are held accountable for their activities which affect the safety and health system.</p> <p>My organization uses rewards and positive feedback to increase safety and health awareness levels.</p> <p>My organization incorporates safety and health performance as part of employee performance appraisal.</p> <p>My organization recognizes and rewards work performance by using good safety and health practices</p>
Supportive Environment	<p>My organization's employee adopts a no blame approach to highlight unsafe work behavior</p> <p>My organization's employee often reminded each other on how to work safely</p> <p>My organization's employee believes that it is our business to maintain a safer and healthier workplace</p> <p>My organization's employee always offers help when needed to perform the job safely.</p> <p>My organization's employee endeavors that individuals do not work alone under risky or hazardous condition</p> <p>My organization's employee always maintains a good working relationship</p> <p>The workload is reasonably balanced among my organization's employees</p>
OHSAS management system adoption	<p>My organization has written, detailed occupational safety and health policy</p> <p>My organization has proactive occupational safety and health policy beyond the compliances of legislative requirement.</p> <p>My organization has established quantifiable occupational safety and health objectives.</p> <p>My organization monitors occupational safety and health cost and benefits.</p> <p>My organization has established the role and responsibilities with respect to occupational safety and health programs</p> <p>My organization has documented procedures for occupational safety and health.</p> <p>My organization provides appropriate training for its employees</p> <p>My organization conducts occupational safety and health audit on a regular basis.</p> <p>My organization conducts reassessment on occupational safety and health on a regular basis.</p> <p>My organization's employee remuneration and promotion are based on occupational safety and health objectives.</p>

companies, 7.03% are public listed companies, 2.30% are small and medium enterprises (SMEs), and others are 8.59%. Fifty percent of companies that responded have more than two safety officers. With regard to working condition, most of the companies are from high risk industries which are exposed to the pollution of air dust (28.91%), noise (21.88%), vibration (15.63%) and heavy physical working condition (9.38%); meanwhile, the remaining 24.22% are from low risk industries. Table 3 provides the details of the participating companies' profile.

#### MEASUREMENT MODEL RESULTS

*Reliability Analysis* In order to assess the inter-item consistency of our measurement items, we have used

the Cronbach's alpha coefficient. As presented in Table 4, all Cronbach's alpha values ranged from 0.839 to 0.934, which are above 0.60 as proposed by Nunnally and Berstein (1994). Therefore, we can conclude that the measurements are reliable.

As this study employed self-reported approach, there is a potential for common method variance. Common method variance is problematic and it happens when a single factor is identified from the un-rotated factor solution and if the first factor accounts the majority of the variance in the variables (Podsakoff, MacKenzie, Lee & Podsakoff 2003). Our un-rotated factor analysis showed that the first factor accounted for only 20.94% and has 74.92% variance. Therefore, the common method bias is not a serious threat in this study.

TABLE 3. Profile of participating companies

Type of industry	Frequency	%
Manufacturing	115	42.12
Construction	45	16.48
Services	42	15.38
Communication / utilities	22	8.06
Transportation	12	4.40
Retail/ wholesales	9	3.30
Government	5	1.83
Finance/ insurance / real estate	4	1.47
Health care	1	0.37
Non Government Organization (NGO)	0	0.00
Others	18	6.59
<i>Number of years in organization</i>		
<5	76	59.38
5-10	34	26.56
11-15	5	3.91
16-20	6	4.69
>20	7	5.47
<i>Number of safety officer</i>		
1	48	37.50
2	18	14.06
>2	62	48.44
<i>Working condition</i>		
High level of noise (high risk)	28	21.88
High level of vibration (high risk)	20	15.63
Pollution of air dust (high risk)	37	28.91
Heavy physical working condition (high risk)	12	9.38
Others (low risk)	31	24.22
<i>Type of organization</i>		
Multinational company	105	82.03
Public Listed Company	9	7.03
Small and Medium Enterprise	3	2.34
Others	11	8.59
<i>Current job position</i>		
Managerial	48	37.50
Non managerial	80	62.50

**Convergent Validity** Firstly, we checked the convergent validity if a particular item measures a latent variable which it supposed to measure (Urbach & Ahlemann 2010). We used factor loadings, composite reliability, and average variance extracted to assess convergent validity (Hair et al. 2010). The results are presented in Table 5. All

items' loadings are above the minimum value of 0.50, as proposed by Hair et al. (2010), and are in their underlying construct created to measure. The AVE ranged from 0.613 to 0.777 revealed that the variance captured by the indicators relative to the measurement error, and it justifies a construct because it is greater than 0.50; as proposed by Barclay, Thompson & Higgins (1995). Besides, the

TABLE 5. Items loadings, composite reliability and the average variance extract for the measurement model

Construct	Items	Loadings	AVE	CR
Management Commitment	MC1	0.883	0.666	0.923
	MC2	0.755		
	MC3	0.853		
	MC4	0.869		
	MC6	0.754		
	MC7	0.772		
	Work Involvement	WI2		
WI3		0.692		
WI4		0.866		
WI5		0.815		
WI6		0.616		
Incentive and Recognition		MI1	0.876	0.777
	MI2	0.825		
	MI3	0.881		
	MI4	0.894		
	MI5	0.927		
Supportive Environment	SE1	0.782	0.712	0.937
	SE2	0.911		
	SE3	0.796		
	SE4	0.882		
	SE5	0.836		
	SE6	0.847		
OHSAS Adoption	OHSAS1	0.814	0.631	0.944
	OHSAS2	0.853		
	OHSAS3	0.794		
	OHSAS4	0.826		
	OHSAS5	0.863		
	OHSAS6	0.774		
	OHSAS7	0.765		
	OHSAS8	0.742		
	OHSAS9	0.782		
	OHSAS10	0.716		

Note: CR denotes Composite Reliability; AVE denotes Average Variance Extracted

TABLE 4. Results of reliability analysis

Construct	Measurement items	Cronbach's $\alpha$	Loading range	Number of items
Management Commitment	MC1, MC2, MC3, MC4, MC6, MC7	0.899	0.754 – 0.883	6 (7)
Work Involvement	WI2, WI3, WI4, WI5, WI6	0.839	0.616 – 0.890	5 (6)
Incentive and Recognition	MI1, MI2, MI3, MI4, MI5	0.928	0.825 – 0.927	5 (5)
Supportive Environment	SE1, SE2, SE3, SE4, SE5, SE6	0.918	0.782 – 0.911	6 (7)
OHSAS Adoption	OHSAS1, OHSAS2, OHSAS3, OHSAS4, OHSAS5, OHSAS6, OHSAS7, OHSAS8, OHSAS9, OHSAS10	0.934	0.716 – 0.863	10 (10)

Note: Final item numbers (initial numbers)

TABLE 6. Loadings and cross loadings

	Employee Involvement	Incentive Recognition	Management Commitment	OHSAS Adoption	Supportive Environment
WI2	<i>0.890</i>	0.756	0.740	0.680	0.749
WI3	<i>0.692</i>	0.429	0.464	0.412	0.413
WI4	<i>0.866</i>	0.674	0.721	0.601	0.622
WI5	<i>0.815</i>	0.450	0.575	0.489	0.596
WI6	<i>0.616</i>	0.315	0.352	0.322	0.317
MI1	0.690	<i>0.876</i>	0.736	0.549	0.711
MI2	0.679	<i>0.825</i>	0.679	0.630	0.665
MI3	0.567	<i>0.881</i>	0.594	0.438	0.536
MI4	0.564	<i>0.894</i>	0.610	0.546	0.580
MI5	0.578	<i>0.927</i>	0.616	0.498	0.592
MC1	0.662	0.688	<i>0.883</i>	0.659	0.650
MC2	0.606	0.481	<i>0.755</i>	0.572	0.581
MC3	0.667	0.620	<i>0.853</i>	0.715	0.599
MC4	0.593	0.578	<i>0.869</i>	0.720	0.524
MC6	0.564	0.656	<i>0.754</i>	0.553	0.625
MC7	0.621	0.611	<i>0.772</i>	0.644	0.596
OHSAS1	0.545	0.482	0.675	<i>0.814</i>	0.577
OHSAS2	0.598	0.594	0.692	<i>0.853</i>	0.577
OHSAS3	0.406	0.327	0.537	<i>0.794</i>	0.472
OHSAS4	0.532	0.554	0.653	<i>0.826</i>	0.600
OHSAS5	0.531	0.486	0.719	<i>0.863</i>	0.552
OHSAS6	0.486	0.276	0.531	<i>0.774</i>	0.553
OHSAS7	0.540	0.558	0.645	<i>0.765</i>	0.573
OHSAS8	0.500	0.352	0.554	<i>0.742</i>	0.465
OHSAS9	0.558	0.585	0.643	<i>0.782</i>	0.575
OHSAS10	0.564	0.606	0.610	<i>0.716</i>	0.531
SE1	0.574	0.660	0.616	0.561	<i>0.782</i>
SE2	0.651	0.655	0.663	0.649	<i>0.911</i>
SE3	0.514	0.488	0.571	0.622	<i>0.796</i>
SE4	0.614	0.578	0.595	0.563	<i>0.882</i>
SE5	0.633	0.580	0.563	0.515	<i>0.836</i>
SE6	0.665	0.626	0.653	0.572	<i>0.847</i>

Note: Bold values are loadings for items which are above the recommended value of 0.50.

composite reliability values in this study ranged from 0.886 to 0.946, which are above the cut off value of 0.70 as proposed by Fornell and Larcker (1981), indicating that the parameters' estimates are accurate.

*Discriminant Validity* Next, we proceed to the discriminant validity test. We assessed whether the measures belong to the construct it intended to measure. Table 6 presents a comparison of each item to its intended construct (loadings) and to all other constructs (cross loadings). As proposed by Chin (1998), going down a particular construct column, we should expect to see item loadings to be higher than the cross loading. Similarly, if we scan across a particular item row, we should expect to see that any item to be more strongly related to its

construct column than any other construct column. The results showed that the loading of each item is greater than all of its cross-loadings.

In addition, we also confirm discriminant validity by examining if a specific construct is more correlated with another construct than its own measures (Chin 2010). We tested this by comparing the square root of the average variance extracted with the correlations among constructs. As presented in Table 7 the square root of the average variance extracted from the latent variable exceeded the correlations of other constructs. In total, we concluded that the measurement model demonstrated adequate discriminant validity.

TABLE 7. Discriminant validity of constructs

	Employee Involvement	Incentive Recognition	Management Commitment	Supportive Environment	OHSAS Adoption
Employee Involvement	0.783				
Incentive Recognition	0.706	0.881			
Management Commitment	0.758	0.741	0.816		
Supportive Environment	0.721	0.708	0.725	0.794	
OHSAS Adoption	0.665	0.615	0.794	0.692	0.844

Note: Diagonals represent the square root of the average variance extracted while the other entries represent the correlations

STRUCTURAL MODEL RESULTS

We then proceeded with the path analysis to test our hypotheses. Figure 2 illustrates the R<sup>2</sup> value of OHSAS adoption was 0.661, suggesting that 66.1% of the variance in OHSAS adoption can be explained by management commitment, work involvement, incentive and recognition, and supportive environment. Based on Figure 2, the item loadings of management commitment ranged from 0.754 to 0.883; item loadings of work involvement ranged from 0.616 to 0.890; item loadings of recognition and incentive ranged from 0.825 to 0.927; item loadings of supportive environment ranged from 0.782 to 0.911; and item loadings of OHSAS adoption ranged from 0.716 to 0.863. In sum, the loadings of all items associated to its respective construct met the minimum cut off value of 0.50, as per Hair et al. (2010). This indicates that the items were adequately measuring their respective construct.

While we run the bootstrapping procedure with 500 re-samples to test the significance of the regression coefficients, the results showed that only management commitment ( $\beta = 5.646, p < 0.01$ ) and supportive environment ( $\beta = 2.779, p < 0.01$ ) were positively related to OHSAS adoption. On the contrary, work involvement ( $\beta = 0.784, p > 0.01$ ) and incentive and recognition ( $\beta = 0.605, p > 0.01$ ) were not significantly related to OHSAS adoption. Therefore, we concluded that our hypotheses, H<sub>1</sub> and H<sub>4</sub> were supported, while H<sub>2</sub> and H<sub>3</sub> were not supported.

DISCUSSION AND CONCLUSION

The purpose of this study was to examine the influence of four determinants (management commitment, work involvement, incentive and recognition, and supportive environment

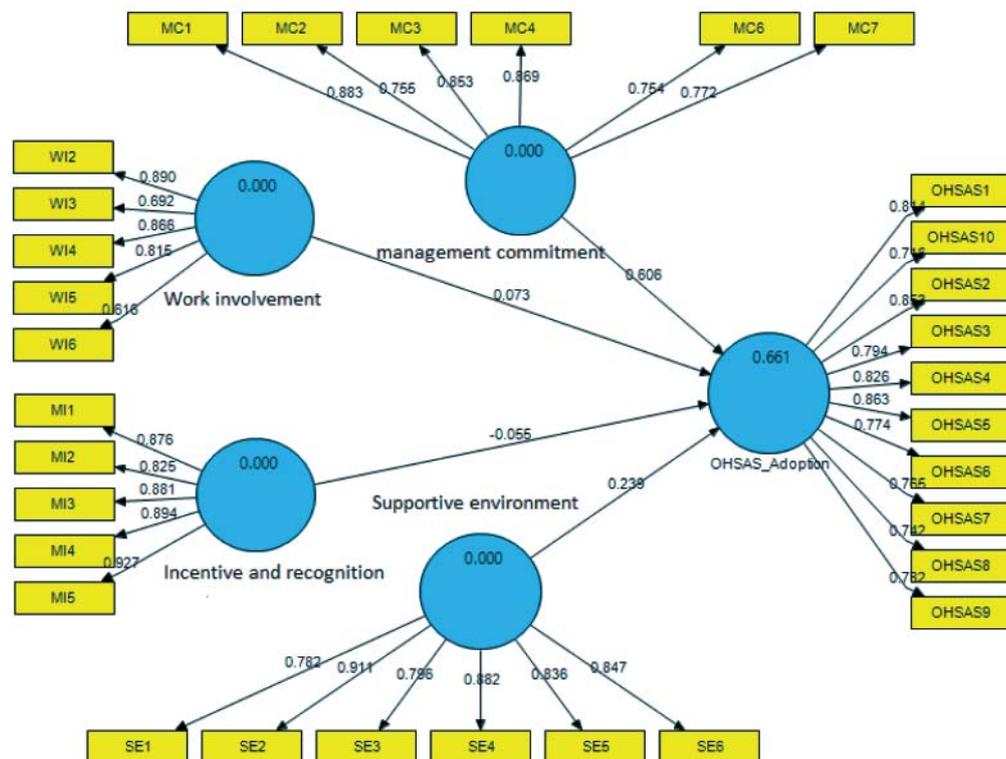


FIGURE 2. Results of path analysis

TABLE 8. Hypotheses testing

Hypothesis	Relationship	Beta	Standard Error	t-value	Decision
H <sub>1</sub>	Management Commitment -> OHSAS Adoption	0.606	0.107	5.646**	Supported
H <sub>2</sub>	Work Involvement -> OHSAS Adoption	0.073	0.093	0.784	Not supported
H <sub>3</sub>	Incentive Recognition -> OHSAS Adoption	-0.055	0.091	0.605	Not supported
H <sub>4</sub>	Supportive Environment -> OHSAS Adoption	0.239	0.086	2.779**	Supported

environment) on OHSAS 18001 management system adoption. In general, the statistical results provided support for two hypothesized relationships. Our results revealed that management commitment and supportive work environment were significantly related to OHSAS 18001 management system adoption. The management with high commitment in OHSAS 18001 will allocate and provide adequate financial support and sufficient resources for its adoption. With the strong financial support and sufficient resources, workers will be motivated to achieve and uphold the OHSAS 18001 requirements. Our findings agreed with the findings of Idoro (2008). In the same vein, the supportive environment is essential in encouraging the OHSAS 18001 management system adoption. By developing and integrating the OHSAS 18001 management system as a part of organizational work environment and corporate identity, it serves as a positive reinforcement to the OHSAS 18001 management system adoption. Our result is congruent to Fernandez et al. (2003).

On the other hand, both work involvement, and incentive and recognition were found to be insignificantly related to OHSAS 18001 management system's adoption. The insignificant relationship of work involvement may be explained by the insufficient opportunity given to the employee in providing suggestion and feedback on OHSAS 18001 management system adoption. Employees are forced to follow the standard operating procedures set by the company. As a result, employees are unlikely to feel satisfied, which in turn lead to less involvement in the OHSAS 18001 management system adoption. Incentive and recognition seem not to be attractive in motivating employees to the support of OHSAS 18001 management system adoption. This may be due to the nature of OHSAS 18001 management system which is through enforcement of safety rules and prescribed procedures to the employees. Regardless of incentive and recognition, it is compulsory for the employees adhere to the OHSAS 18001 requirements. Therefore, incentive and recognition given to employees will not speed up and simultaneously encourage OHSAS 1801 management system adoption.

Based on the findings, the study validated and confirmed the relationship between the institutional factors (management commitment, work involvement,

recognition and incentive, and supportive environment) and the adoption of OHSAS 18001 management system. This study is consistent with institutional theory; whereby it proposes that institutional factors are preceded influences on the OHSAS 18001 management system adoption. Therefore, the study fully supports this theory as the determinants, such as management commitment and supportive environment influence, could encourage the OHSAS 18001 management system adoption. In the context of Malaysia, this study also provides additional knowledge and understanding in the role of institutional factors in the adoption of the OHSAS 18001 management system in Malaysia.

Besides, our findings also offer two main practical implications. Firstly, management commitment is the most important determinant in the OHSAS 18001 management system adoption. Since top management is the main decision maker of the organization, management is required to analyze and evaluate the need for the company to adopt OHSAS 18001 management system. In addition, highly committed management should effectively and clearly communicate the importance of the OHSAS 18001 management system adoption to the employees. Besides, committed management should act as a good role model for employees by exhibiting positive behavior and attitude in adopting the OHSAS 18001 management system. Secondly, a supportive environment should be made available to the OHSAS 18001 steering committee to fully implement the OHSAS management system in the organization. This supportive environment can be in the form of positive work behaviors, and work practices of the employees, as well as organizational culture with respect to the safety and health at the work place.

The principal limitation of this study is the generalization of the respondents. The respondents were limited to companies certified with OHSAS 18001 management system by SIRIM QAS. There are other certification companies, such as BM Trada, and SGS Certification Bodies, which also provide similar certification service for OHSAS 18001 management system. In order to generalize the finding, future research may include samples that obtain their certifications from different certification bodies.

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